



[7590-01-P]

**NUCLEAR REGULATORY COMMISSION**

**[Docket No. 50-305; NRC-2015-0089]**

**Dominion Energy Kewaunee, Inc.**

**Kewaunee Power Station**

**AGENCY:** Nuclear Regulatory Commission.

**ACTION:** Exemption; issuance.

**SUMMARY:** The U.S. Nuclear Regulatory Commission (NRC) is issuing an exemption from the requirement to maintain a specified level of onsite property damage insurance in response to a request from Dominion Energy Kewaunee, Inc. (DEK or the licensee) dated March 20, 2014. This exemption would permit the licensee to reduce its onsite property damage insurance from \$1.06 billion to \$50 million.

**DATES:** [INSERT DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]

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**FOR FURTHER INFORMATION CONTACT:** William Huffman, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington DC 20555-0001; telephone: 301-415-2046; e-mail: [William.Huffman@nrc.gov](mailto:William.Huffman@nrc.gov).

**SUPPLEMENTARY INFORMATION:**

**I. Background.**

The Kewaunee Power Station (KPS) facility is a decommissioning power reactor located on approximately 900 acres in Carlton (Kewaunee County), Wisconsin, which is 27 miles southeast of Green Bay, Wisconsin. The licensee, DEK, is the holder of KPS Renewed Facility

Operating License No. DPR-43. The license provides, among other things, that the facility is subject to all rules, regulations, and orders of the NRC now or hereafter in effect.

By letter dated February 25, 2013 (ADAMS Accession No. ML13058A065), DEK submitted a certification to the NRC indicating it would permanently cease power operations at KPS on May 7, 2013. On May 7, 2013, DEK permanently shut down the KPS reactor. On May 14, 2013, DEK certified that it had permanently defueled the KPS reactor vessel (ADAMS Accession No. ML13135A209). As a permanently shutdown and defueled facility, and under Section 50.82(a)(2) of Title 10 of the *Code of Federal Regulations* (10 CFR), DEK is no longer authorized to operate the KPS reactor or emplace nuclear fuel into the reactor vessel. The licensee is still authorized to possess and store irradiated nuclear fuel. Irradiated fuel is currently being stored onsite in a spent fuel pool (SFP) and in independent spent fuel storage installation dry casks.

## **II. Request/Action.**

Under 10 CFR 50.12, "Specific exemptions," DEK has requested an exemption from 10 CFR 50.54(w)(1) by a letter dated March 20, 2014 (ADAMS Accession No. ML14090A111). The exemption from the requirements of 10 CFR 50.54(w)(1) would permit DEK to reduce its onsite property damage insurance from \$1.06 billion to \$50 million.

The regulation in 10 CFR 50.54(w)(1) requires each licensee to have and maintain onsite property damage insurance to stabilize and decontaminate the reactor and reactor site in the event of an accident. The onsite insurance coverage must be either \$1.06 billion or whatever amount of insurance is generally available from private sources (whichever is less).

The licensee states that the risk of an accident at a permanently shutdown and defueled reactor is much less than the risk from an operating power reactor. In addition, since reactor operation is no longer authorized at KPS, there are no events that would require the stabilization

of reactor conditions after an accident. Similarly, the risk of an accident that that would result in significant onsite contamination at KPS is also much lower than the risk of such an event at operating reactors. Therefore, DEK is requesting an exemption from 10 CFR 50.54(w)(1) to reduce its onsite property damage insurance from \$1.06 billion to \$50 million, commensurate with the reduced risk of an accident at the permanently shutdown and defueled KPS site.

### **III. Discussion.**

Under 10 CFR 50.12, the Commission may, upon application by any interested person or upon its own initiative, grant exemptions from the requirements of 10 CFR part 50 when 1) the exemptions are authorized by law, will not present an undue risk to public health or safety, and are consistent with the common defense and security; and 2) any of the special circumstances listed in 10 CFR 50.12(a)(2) are present.

The financial protection limits of 10 CFR 50.54(w)(1) were established after the Three Mile Island accident out of concern that licensees may be unable to financially cover onsite cleanup costs in the event of a major nuclear accident. The specified \$1.06 billion coverage amount requirement was developed based on an analysis of an accident at a nuclear reactor operating at power, resulting in a large fission product release and requiring significant resource expenditures to stabilize the reactor conditions and ultimately decontaminate and cleanup the site (similar to the stabilization and cleanup activities at the Fukushima Daiichi nuclear power facility following the damage from a severe earthquake and tsunami).

These cost estimates were developed based on the spectrum of postulated accidents for an operating nuclear reactor. Those costs were derived from the consequences of a release of radioactive material from the reactor. Although the risk of an accident at an operating reactor is very low, the consequences can be large. In an operating plant, the high temperature and pressure of the reactor coolant system (RCS), as well as the inventory of relatively short-lived

radionuclides, contribute to both the risk and consequences of an accident. With the permanent cessation of reactor operations at KPS and the permanent removal of the fuel from the reactor core, such accidents are no longer possible. As a result, the reactor, RCS, and supporting systems no longer operate and, therefore, have no function related to the storage of the irradiated fuel. Hence, postulated accidents involving failure or malfunction of the reactor, RCS, or supporting systems are no longer applicable.

During reactor decommissioning, the principal radiological risks are associated with the storage of spent fuel onsite. In its March 20, 2014, exemption request, DEK discusses both design-basis and beyond-design-basis events involving irradiated fuel stored in the SFP. The licensee states that there are no possible design-basis events at KPS that could result in a radiological release exceeding the limits established by the U.S. Environmental Protection Agency's (EPA's) early-phase Protective Action Guidelines (PAGs) of 1 roentgen equivalent man at the exclusion area boundary. The only accident that might lead to a significant radiological release at a decommissioning reactor is a zirconium fire. The zirconium fire scenario is a postulated, but highly unlikely, beyond-design-basis accident scenario that involves loss of all water inventory from the SFP, resulting in a significant heat-up of the spent fuel, and culminating in substantial zirconium cladding oxidation and fuel damage. The probability of a zirconium fire scenario is related to the decay heat of the irradiated fuel stored in the SFP. Therefore, the risks from a zirconium fire scenario continue to decrease as a function of the time that KPS has been permanently shut down.

The licensee provided a detailed analysis of hypothetical beyond-design-basis accidents that could result in a radiological release at KPS in its January 16, 2014, submittal to the NRC (ADAMS Accession No. ML14029A076). One of these beyond-design-basis accidents involves a complete loss of SFP water inventory, where cooling of the spent fuel would be primarily accomplished by natural circulation of air through the uncovered spent fuel assemblies. The licensee's analysis of this accident shows that by October 30, 2014, air-cooling of the spent fuel

assemblies will be sufficient to keep the fuel within a safe temperature range indefinitely without fuel damage or radiological release. This is important, because the NRC staff has previously authorized a lesser amount of onsite property damage insurance coverage based on analysis of the zirconium fire risk. In SECY-96-256, "Changes to Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors, 10 CFR 50.54(w)(1) and 10 CFR 140.11," dated December 17, 1996 (ADAMS Accession No. ML15062A483), the staff recommended changes to the power reactor insurance regulations that would allow licensees to lower onsite insurance levels to \$50 million upon demonstration that the fuel stored in the SFP can be air-cooled. In its Staff Requirements Memorandum to SECY-96-256, dated January 28, 1997 (ADAMS Accession No. ML15062A454), the Commission supported the staff's recommendation that, among other things, would allow permanently shutdown power reactor licensees to reduce commercial onsite property damage insurance coverage to \$50 million when the licensee was able to demonstrate the technical criterion that the spent fuel could be air-cooled if the spent fuel pool was drained of water. The staff has used this technical criterion to grant similar exemptions to other decommissioning reactors (e.g., Maine Yankee Atomic Power Station, published in the *Federal Register* on January 19, 1999 (64 FR 2920); and Zion Nuclear Power Station, published in the *Federal Register* on December 28, 1999 (64 FR 72700)). These prior exemptions were based on these licensees demonstrating that the SFP could be air-cooled, consistent with the technical criterion discussed above.

In SECY-00-0145, "Integrated Rulemaking Plan for Nuclear Power Plant Decommissioning," dated June 28, 2000, and SECY-01-0100, "Policy Issues Related to Safeguards, Insurance, and Emergency Preparedness Regulations at Decommissioning Nuclear Power Plants Storing Fuel in the Spent Fuel Pools," dated June 4, 2001 (ADAMS Accession Nos. ML003721626 and ML011450420, respectively), the NRC staff discussed additional information concerning SFP zirconium fire risks at decommissioning reactors and associated implications for onsite property damage insurance. Providing an analysis of when

the spent fuel stored in the SFP is capable of air-cooling is one measure that can be used to demonstrate that the probability of a zirconium fire is exceedingly low. However, the staff has more recently used an additional analysis that bounds an incomplete drain down of the SFP water, or some other catastrophic event (such as a complete drainage of the SFP with rearrangement of spent fuel rack geometry and/or the addition of rubble to the SFP). The analysis postulates that decay heat transfer from the spent fuel via conduction, convection, or radiation would be impeded. This analysis is often referred to as an adiabatic heatup.

The licensee's analyses, as referenced in its March 20, 2014, exemption request, demonstrates that under conditions where the SFP water inventory has drained and only air-cooling of the stored irradiated fuel is available, there is reasonable assurance that after October 2014, the KPS spent fuel will remain at temperatures far below those associated with a significant radiological release. In addition, the licensee has also provided an adiabatic heatup analysis, demonstrating that as of October 21, 2014, there will be at least 10 hours after the loss of all means of cooling (both air and/or water), before the spent fuel cladding would reach a temperature where the potential for a significant offsite radiological release could occur. The licensee states that should all means to cool the spent fuel be lost, 10 hours is sufficient time for personnel to respond with additional resources, equipment, and capability to restore cooling to the SFP, even after a non-credible, catastrophic event. As provided in DEK's letters dated August 23, 2013 (ADAMS Accession No. ML13242A019), and January 10, 2014 (ADAMS Accession No. ML14016A078), DEK furnished information concerning its makeup strategies, in the event of a loss of SFP coolant inventory. The multiple strategies for providing makeup to the SFP include: using existing plant systems for inventory makeup; supplying water through hoses to a spool piece connection to the existing SFP piping; or using a diesel-driven portable pump to take suction from Lake Michigan and provide makeup or spray to the SFP. These strategies will be maintained by a license condition. DEK states that the equipment needed to perform these actions are located onsite, and that the external makeup strategy (using a diesel

driven portable pump) is capable of being deployed within 2 hours. DEK stated that, considering the very low-probability of beyond-design-basis accidents affecting the SFP, these diverse strategies provide defense-in-depth and time to mitigate and prevent a zirconium fire using makeup or spray to the SFP before the onset of zirconium cladding rapid oxidation.

In the safety evaluation of the licensee's request for exemptions from certain emergency planning requirements dated October 27, 2014 (ADAMS Accession No. ML14261A223), the NRC staff assessed the DEK accident analyses associated with the radiological risks from a zirconium fire at the permanently shutdown and defueled KPS site. The staff has confirmed that under conditions where cooling airflow can develop, suitably conservative calculations indicate that by the end of October 2014, the fuel will remain at temperatures where the cladding will be undamaged for an unlimited period. For the very unlikely beyond-design-basis accident scenario, where the SFP coolant inventory is lost in such a manner that all methods of heat removal from the spent fuel are no longer available, there will be a minimum of 10 hours from the initiation of the accident until the cladding reaches a temperature where offsite radiological release might occur. The staff finds that 10 hours is sufficient time to support deployment of mitigation equipment to prevent the zirconium cladding from reaching a point of rapid oxidation.

The staff's basis as to why it considers \$50 million to be an adequate level of onsite property damage insurance for a decommissioning reactor, once the spent fuel in the SFP is no longer susceptible to a zirconium fire, is provided in SECY-96-256. The staff has postulated that there is still a potential for other radiological incidents at a decommissioning reactor that could result in significant onsite contamination besides a zirconium fire. In SECY-96-256, the NRC staff cited the rupture of a large contaminated liquid storage tank, causing soil contamination and potential groundwater contamination, as the most costly postulated event to decontaminate and remediate (other than a SFP zirconium fire). The postulated large liquid



radwaste storage tank rupture event was determined to have a bounding onsite cleanup cost of approximately \$50 million.

The NRC staff has determined that the licensee's proposed reduction in onsite property damage insurance coverage to a level of \$50 million is consistent with SECY-96-256. In addition, the staff notes that there is a precedent of granting a similar exemption to other permanently shutdown and defueled power reactors. As previously stated, the staff concluded that as of October 30, 2014, sufficient irradiated fuel decay time has elapsed at KPS to decrease the probability of an onsite radiological release from a postulated zirconium fire accident to negligible levels. In addition, the licensee's proposal to reduce onsite insurance to a level of \$50 million is consistent with the maximum estimated cleanup costs for the recovery from the rupture of a large liquid radwaste storage tank.

**A. Authorized by Law.**

Under 10 CFR 50.12, the Commission may grant exemptions from the regulations in 10 CFR part 50, as the Commission determines are authorized by law. The NRC staff has determined that granting of the licensee's proposed exemption will not result in a violation of the Atomic Energy Act of 1954, or other laws, as amended. Therefore, the exemption is authorized by law.

**B. No Undue Risk to Public Health and Safety.**

The onsite property damage insurance requirements of 10 CFR 50.54(w)(1) were established to provide financial assurance that following a significant nuclear incident, onsite conditions could be stabilized and the site decontaminated. The requirements of 10 CFR 50.54(w)(1) and the existing level of onsite insurance coverage for KPS are predicated on the assumption that the reactor is operating. However, KPS is a permanently shutdown and defueled facility. The permanently defueled status of the facility has resulted in a significant

reduction in the number and severity of potential accidents, and correspondingly, a significant reduction in the potential for and severity of onsite property damage. The proposed reduction in the amount of onsite insurance coverage does not impact the probability or consequences of potential accidents. The proposed level of insurance coverage is commensurate with the reduced risk and reduced cost consequences of potential nuclear accidents at KPS. Therefore, the NRC staff concludes that granting the requested exemption will not present an undue risk to the health and safety of the public.

**C. Consistent with the Common Defense and Security.**

The proposed exemption would not eliminate any requirements associated with physical protection of the site and would not adversely affect DEK's ability to physically secure the site or protect special nuclear material. Physical security measures at KPS are not affected by the requested exemption. Therefore, the proposed exemption is consistent with the common defense and security.

**D. Special Circumstances.**

Under 10 CFR 50.12(a)(2)(ii), special circumstances are present if the application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule. The underlying purpose of 10 CFR 50.54(w)(1) is to provide reasonable assurance that adequate funds will be available to stabilize conditions and cover onsite cleanup costs associated with site decontamination, following an accident that results in the release of a significant amount of radiological material. Because KPS is permanently shut down and defueled, it is no longer possible for the radiological consequences of design-basis accidents or other credible events at KPS to exceed the limits of the EPA PAGs at the exclusion area boundary. The licensee has performed site-specific analyses of highly unlikely, beyond-design-basis zirconium fire accidents involving the

stored irradiated fuel in the SFP. The analyses show that after October 30, 2014, the probabilities of such an accident are minimal. The NRC staff's evaluation of the licensee's analyses confirm this conclusion.

The NRC staff also finds that the licensee's proposed \$50 million level of onsite insurance is consistent with the bounding cleanup and decontamination cost, as discussed in SECY-96-256, to account for hypothetical rupture of a large liquid radwaste tank at the KPS site, should such an event occur. The staff notes that KPS's technical specifications provide controls for unprotected outdoor liquid storage tanks to limit the quantity of radioactivity contained in these tanks, in the event of an uncontrolled release of the contents of these tanks. Therefore, the staff concludes that the application of the current requirements in 10 CFR 50.54(w)(1) to maintain \$1.06 billion in onsite insurance coverage is not necessary to achieve the underlying purpose of the rule for the permanently shutdown and defueled KPS reactor.

Under 10 CFR 50.12(a)(2)(iii), special circumstances are present whenever compliance would result in undue hardship or other costs that are significantly in excess of those contemplated when the regulation was adopted, or that are significantly in excess of those incurred by others similarly situated.

The NRC staff concludes that if the licensee was required to continue to maintain an onsite insurance level of \$1.06 billion, the associated insurance premiums would be in excess of those necessary and commensurate with the radiological contamination risks posed by the site. In addition, such insurance levels would be significantly in excess of other decommissioning reactor facilities that have been granted similar exemptions by the NRC.

The NRC staff finds that compliance with the existing rule would result in an undue hardship or other costs that are significantly in excess of those contemplated when the regulation was adopted and are significantly in excess of those incurred by others similarly situated.

Therefore, the special circumstances required by 10 CFR 50.12(a)(2)(ii) and

10 CFR 50.12(a)(2)(iii) exist.

#### **E. Environmental Considerations.**

The NRC approval of the exemption to insurance or indemnity requirements belongs to a category of actions that the Commission, by rule or regulation, has declared to be a categorical exclusion, after first finding that the category of actions does not individually or cumulatively have a significant effect on the human environment. Specifically, the exemption is categorically excluded from further analysis under § 51.22(c)(25).

Under 10 CFR 51.22(c)(25), granting of an exemption from the requirements of any regulation of Chapter I to 10 CFR is a categorical exclusion provided that (i) there is no significant hazards consideration; (ii) there is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite; (iii) there is no significant increase in individual or cumulative public or occupational radiation exposure; (iv) there is no significant construction impact; (v) there is no significant increase in the potential for or consequences from radiological accidents; and (vi) the requirements from which an exemption is sought involve: surety, insurance, or indemnity requirements

The Director, Division of Operating Reactor Licensing, Office of Nuclear Reactor Regulation, has determined that approval of the exemption request involves no significant hazards consideration because reducing the licensee's onsite property damage insurance for KPS does not 1) involve a significant increase in the probability or consequences of an accident previously evaluated; or 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety.

The exempted financial protection regulation is unrelated to the operation of KPS.

Accordingly, there is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite; and no significant increase in individual or cumulative public or occupational radiation exposure. The exempted regulation is not associated with

construction, so there is no significant construction impact. The exempted regulation does not concern the source term (i.e., potential amount of radiation in an accident), nor mitigation. Therefore, there is no significant increase in the potential for, or consequences of, a radiological accident. In addition, there would be no significant impacts to biota, water resources, historic properties, cultural resources, or socioeconomic conditions in the region. The requirement for onsite property damage insurance may be viewed as involving surety, insurance, or indemnity matters.

Therefore, pursuant to 10 CFR 51.22(b) and 51.22(c)(25), no environmental impact statement or environmental assessment need be prepared in connection with the approval of this exemption request.

#### **IV. Conclusions.**

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12(a), the exemption is authorized by law, will not present an undue risk to the public health and safety, and is consistent with the common defense and security. Also, special circumstances are present. Therefore, the Commission hereby grants DEK an exemption from the requirements of 10 CFR 50.54(w)(1), to permit the licensee to reduce its onsite property damage insurance to a level of \$50 million.

The exemption is effective upon issuance.

Dated at Rockville, Maryland, this 3<sup>rd</sup> day of April, 2015.

For the Nuclear Regulatory Commission.

Michele G. Evans, Director,  
Division of Operating Reactor Licensing,  
Office of Nuclear Reactor Regulation.

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